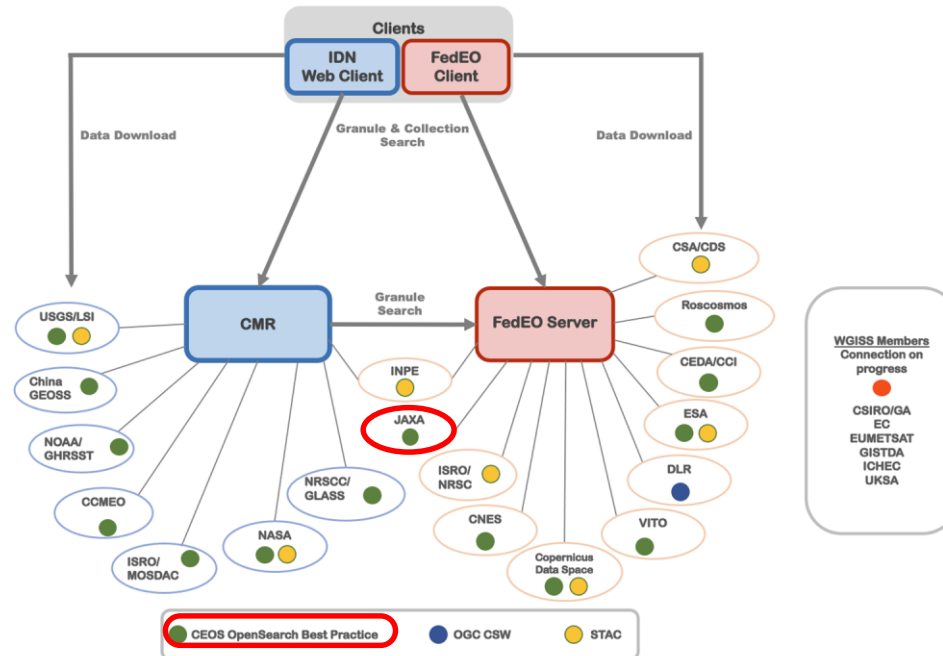


Progress and opening of STAC API catalog at JAXA

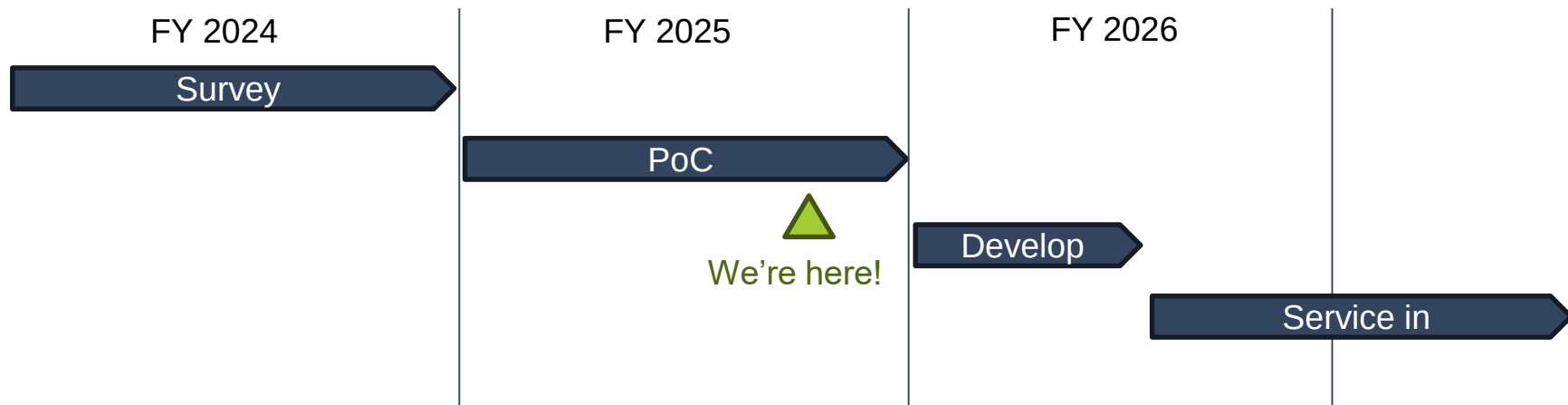
Yousuke Ikehata, JAXA
Agenda Item 4.5
WGISS-61
17 March, 2026
Dehradun, INDIA

❖ JAXA connects CEOS catalog linkage with Opensearch

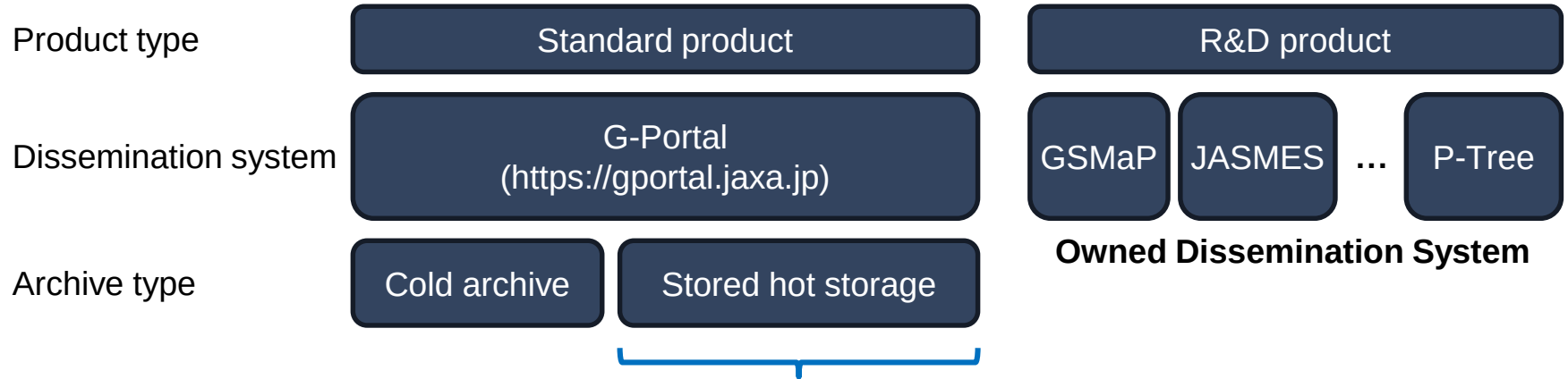


- ❖ JAXA will replace Opensearch service to STAC API in FY2026.
 - 1st step search
 - <https://gpwos1.jaxa.jp/examind/api/WS/csw/preview/opensearch>
 - 2nd step search
 - <https://gportal.jaxa.jp/csw/csw>
- ❖ JAXA connects “fedeo” and provides both collections level and granules levels’ catalogs.

❖ JAXA started to develop STAC API



Coverage for catalogs



We provides those catalogs via Opensearch



New STAC API will also cover same at first step.

But we consider whether to expand the scope.

- ❖ JAXA took stac-fastapi for STAC API service.
 - <https://github.com/stac-utils/stac-fastapi>
- ❖ Elasticsearch is used for backend service.
 - Performance and scalability is good in our PoC.
 - Over 20 Million catalogs will be ingested.

- ❖ STAC endpoint is available but not official released service
 - <https://gpwstac1.tksc.jaxa.jp>
- ❖ Develops functions for catalog conversion
 - Platforms and instruments which has finished observation is developed
 - Operation ones are on going.
- ❖ The numbers of catalogs are increasing in day by day

❖ CEOS-STAC-REC-3255 - Additional search parameter names^{NG}

[Recommendation]

- A CEOS STAC collection/granule catalog supporting additional search parameters for collection search (e.g. search by platform, instrument, organisation) or granule search (e.g. by polarisation mode, orbit direction, orbit number, cloud cover, etc.) should, by preference, use names consistent with the names defined in the OpenSearch extension for Earth Observation OGC 13-026r9 [RD04].
- ❖ Our stac catalogs are converted from parameter files which generated when processing, so we didn't consider “OGC 13-026r9”.
 - We will be able to suit OGC definition next term.

❖ CEOS-STAC-REC-3420 - Root relation [Recommendation]

NG

- Implementations should not use the rel="root" relation in STAC collection and item encodings as the original catalog/collections may be referenced or included in a federated catalog with a different root.

❖ Our stac catalogs consist “rel”: “root”

- We don't consider federation now.

❖ CEOS-STAC-REQ-6235 - Polygon geometry [Requirement] ^{NG}

- The geographical extent of an Item represented as polygon shall follow the right-hand rule with respect to the area it bounds and in case of a polygon with more than one ring, the first shall be the exterior ring and the others shall be interior rings as required by the GeoJSON specification.

❖ We also recognize this requirement is important and our incompatibility is problem.

- Our stac service using elasticsearch and it can accept only GeoJSON.
- Our polygon can't also involve “Crossing the meridian”, “Overlapping lines” and “Sharing vertices”.
- We're planning to develop conversion tool in next fiscal year.

❖ CEOS-STAC-REC-7520 - Parent relation [Recommendation]^{NG}

- Implementations should not use the `rel="parent"` relation in STAC collection encodings as the original collection may be referenced or included in a federated catalog below a different parent.

❖ Our stac catalogs consist “rel”: “parent”

- Current our stac catalogs is formed “Tree structure” which doesn’t consist cross reference and merge.

NG

❖ CEOS-STAC-REC-7530 - Keywords [Requirement]

- CEOS STAC collection metadata shall contain at least one platform keyword, one corresponding instrument keyword and one science keyword encoded according to CEOS-STAC-REQ-7220, CEOS-STAC-REQ-7230 and CEOS-STAC-REQ-7240.

❖ The reason is the same as CEOS-STAC-REC-3255.

- Our stac catalogs are converted from parameter files which generated when processing, so we didn't consider "OGC 13-026r9". We will be able to suit OGC definition next term.

❌ 緯度経度が139.69,35.59 140.02,35.79の範囲を観測したSLATS_SHIROP_L2_ORIのデータはありますか

指定された緯度経度範囲（139.69,35.59 140.02,35.79）でSLATS_SHIROP_L2_ORIのデータを検索してみます。

S Search items
S Search collections
S Get collection
S Search items
S Search items

はい、指定された緯度経度範囲（139.69,35.59 140.02,35.79）でSLATS_SHIROP_L2_ORIのデータが見つかりました。

SLATS_SHIROP_L2_ORIコレクションの概要：

- ・ 名称：SLATS/SHIROP L2 放射量補正・幾何補正画像
- ・ 期間：2018年2月19日 - 2019年10月2日
- ・ 解像度：1.3m - 0.40m（高度によって変動）
- ・ 位置精度：南北方向約30m、東西方向約52m
- ・ データ形式：GeoTIFF
- ・ 投影法：UTM

検索結果： 指定の範囲で50件のデータが見つかりました。主に2019年9月-10月の画像で、以下のような特徴があります：

- ・ 観測期間：2019年9月19日 - 2019年10月1日
- ・ UTMゾーン：複数のUTMゾーンにまたがる（UTM53N、UTM54N等）
- ・ データタイプ：RawとCompの両方が存在

この範囲は東京都心部から多摩地域にかけての範囲のようですが、SLATS（超低高度衛星技術試験機）のSHIROP（小型高分解能光学センサ）による高解像度画像が利用可能です。

特定の画像の詳細情報が必要でしたら、どの観測日時のデータに興味がありか教えていただけますか？

Search by natural languages

MCP connection



Claude

Prompt

MCP client



MCP server



SpatioTemporal
Asset Catalog

STAC BP compatibility

3. Best Practices(1/2)



ID	Title	Requirement	Compatibility
CEOS-STAC-PER-3210	API Feature paths	Permission	OK
CEOS-STAC-PER-3220	API Feature relations	Permission	OK
CEOS-STAC-CREQ-3230	Additional search parameters	Conditional	OK
CEOS-STAC-REQ-3235	Parameter Descriptions	Requirement	OK
CEOS-STAC-CREQ-3240	Additional search parameters	Conditional	OK
CEOS-STAC-CREQ-3250	CQL subset	Conditional	OK
CEOS-STAC-REC-3255	Additional search parameter names	Recommendation	NG
CEOS-STAC-REC-3260	Standalone JSON Schema	Recommendation	Partial
CEOS-STAC-REQ-3265	numberMatched	Requirement	OK
CEOS-STAC-REC-3270	numberReturned	Recommendation	OK
CEOS-STAC-REQ-3280	Result set navigation	Requirement	OK
CEOS-STAC-REC-3290	Result set navigation	Recommendation	OK
CEOS-STAC-REC-3295	Result set navigation	Recommendation	OK

STAC BP compatibility

3. Best Practices(2/2)



ID	Title	Requirement	Compatibility
CEOS-STAC-REC-3297	Exceptions	Recommendation	OK
CEOS-STAC-REC-3299	Alternative response formats	Recommendation	Not implemented
CEOS-STAC-REC-3305	Common metadata	Recommendation	OK
CEOS-STAC-REC-3308	Controlled keywords	Recommendation	Not implemented
CEOS-STAC-REQ-3310	Resource associations	Requirement	OK
CEOS-STAC-REQ-3320	Metadata assets	Requirement	OK
CEOS-STAC-REQ-3325	Link and Asset type attributes	Requirement	OK
CEOS-STAC-REC-3330	Asset roles	Recommendation	OK
CEOS-STAC-REC-3350	Reference to metadata	Recommendation	OK
CEOS-STAC-REC-3360	Reference to documentation	Recommendation	OK
CEOS-STAC-REQ-3410	Absolute links	Requirement	OK
CEOS-STAC-REC-3420	Root relation	Recommendation	NG
CEOS-STAC-REC-3430	Collection identifier	Recommendation	OK

STAC BP compatibility

4. Granule Catalog Best Practices



ID	Title	Requirement	Compatibility
CEOS-STAC-REQ-4310	Granule search endpoints	Requirement	OK
CEOS-STAC-PER-4320	Cross-collection granule search endpoint	Permission	OK
CEOS-STAC-REQ-4330	Cross-collection granule search method	Requirement	OK
CEOS-STAC-REQ-4340	Supported granule search parameters	Requirement	OK
CEOS-STAC-REQ-4350	Additional granule search queryables	Requirement	OK
CEOS-STAC-REQ-4630	Item search response representation	Requirement	OK
CEOS-STAC-REQ-4635	Item search numberMatched	Requirement	OK
CEOS-STAC-REQ-4640	Allow for granule search-by-id	Requirement	OK
CEOS-STAC-REQ-4645	Item search response representation	Requirement	OK

STAC BP compatibility

5. Collection Catalog Best Practices



ID	Title	Requirement	Compatibility
CEOS-STAC-REQ-5210	Collection access	Requirement	OK
CEOS-STAC-CREQ-5320	Collections endpoint	Conditional	OK
CEOS-STAC-REQ-5330	Collection search method	Requirement	OK
CEOS-STAC-REC-5335	Collection search endpoint	Recommendation	OK
CEOS-STAC-REQ-5340	Supported search parameters	Requirement	OK
CEOS-STAC-REQ-5360	Free text search	Requirement	OK
CEOS-STAC-CREQ-5370	Collection queryables	Conditional	OK
CEOS-STAC-REQ-5372	Collection search response representation	Requirement	OK
CEOS-STAC-REQ-5373	Allow for collection search-by-id	Requirement	OK
CEOS-STAC-REQ-5374	Collection search response representation	Requirement	OK
CEOS-STAC-REC-5380	Support for two step search	Recommendation	OK
CEOS-STAC-REQ-5390	Support for granule search	Requirement	OK
CEOS-STAC-REC-5392	Support for granule search	Recommendation	OK
CEOS-STAC-REQ-5393	Support for granule search	Requirement	OK
CEOS-STAC-REQ-5395	Support for granule search	Requirement	OK

STAC BP compatibility

6. Granule Metadata Best Practices



ID	Title	Requirement	Compatibility
CEOS-STAC-REQ-6210	Granule representation	Requirement	OK
CEOS-STAC-REC-6220	Temporal extents	Recommendation	OK
CEOS-STAC-REQ-6230	Geographical extents	Requirement	OK
CEOS-STAC-REQ-6235	Polygon geometry	Requirement	NG
CEOS-STAC-REQ-6240	Minimum-bounding rectangle	Requirement	OK
CEOS-STAC-REQ-6250	Granule representation extension	Recommendation	OK
CEOS-STAC-PER-6255	Granule representation extension validation	Permission	OK
CEOS-STAC-REC-6310	Browse image	Recommendation	OK
CEOS-STAC-REC-6320	Thumbnail image	Recommendation	OK
CEOS-STAC-REC-6330	Data access	Recommendation	OK
CEOS-STAC-REC-6340	Data access to multiple files	Recommendation	OK
CEOS-STAC-REC-6360	Alternate locations	Recommendation	OK
CEOS-STAC-REC-6370	Common band names	Recommendation	OK
CEOS-STAC-REC-6410	WMS Offering	Recommendation	Not implemented
CEOS-STAC-REQ-6510	Absolute links	Requirement	OK

STAC BP compatibility

7. Collection Metadata Best Practices



ID	Title	Requirement	Compatibility
CEOS-STAC-REQ-7210	Collection representation	Requirement	OK
CEOS-STAC-REC-7215	Collection metadata dates	Recommendation	Partial
CEOS-STAC-REQ-7220	Platform information	Requirement	OK
CEOS-STAC-REQ-7230	Instrument information	Requirement	OK
CEOS-STAC-REQ-7240	Science keywords	Requirement	OK
CEOS-STAC-REQ-7250	DOI	Requirement	OK
CEOS-STAC-REQ-7260	Provider names	Requirement	OK
CEOS-STAC-REQ-7310	Item assets	Recommendation	OK
CEOS-STAC-REQ-7410	Support for granule search	Requirement	OK
CEOS-STAC-REC-7420	Support for granule search	Recommendation	OK
CEOS-STAC-REQ-7430	Support for granule search	Requirement	OK
CEOS-STAC-REQ-7440	Support for granule search	Requirement	OK
CEOS-STAC-REC-7450	Reference to license	Recommendation	OK
CEOS-STAC-REQ-7510	Absolute links	Requirement	OK
CEOS-STAC-REC-7520	Parent relation	Recommendation	NG
CEOS-STAC-REC-7530	Keywords	Requirement	NG

STAC BP compatibility

8. Federation Best Practices



ID	Title	Requirement	Compatibility
CEOS-STAC-REQ-8510	No authentication for discovery	Requirement	OK
CEOS-STAC-REC-8520	Advertising authentication interface	Recommendation	OK
CEOS-STAC-REC-8530	Advertising OpenID Connect authentication interface in granule metadata	Recommendation	N/A